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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,988	01/02/2004	Klaus Hartig	44046.203.214.1	5489

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INTELLECTUAL PROPERTY GROUP
FREDRIKSON & BYRON, P.A.
200 SOUTH SIXTH STREET
SUITE 4000
MINNEAPOLIS, MN 55402

EXAMINER	
BAREFORD, KATHERINE A	
ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 12/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/750,988	HARTIG, KLAUS	
	Examiner	Art Unit	
	Katherine A. Bareford	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-54* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *39,41-51,53 and 54* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Claims 1-38, 40 and 52 are canceled

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *attached*.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 27, 2006 has been entered.

The amendment filed with the RCE submission of October 27, 2006 has been received and entered. With the amendment, claims 1-38, 40 and 52 are canceled, and claims 39, 41-51 and 53-54 (including new claims 53-54) are pending for examination.

Election/Restrictions

2. The Examiner notes that non-elected claims 1-38 have been canceled with the amendment of October 27, 2006.

Double Patenting

3. Applicant is advised that should claim 42 be found allowable, claim 53 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both

cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The rejection of claims 39 and 40 under 35 U.S.C. 103(a) as being unpatentable over Hyllberg (US 5707326) in view of Boguslavsky et al (US 4957058) is withdrawn due to applicant's amendments to the claims as to the requirements of the target of October 27, 2006.

6. Claims 39 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mishima (US 5338425) in view of Boguslavsky et al (US 4957058).

Mishima teaches that it is well known to desire to uniformly coat cylindrical sputtering targets with various materials. Column 2, lines 50-65, column 3, lines 45-50 and column 8, lines 29-45. The materials are applied by plasma spraying using plasma

gas generated in an atmosphere or non-reactive gas atmosphere. Column 3, lines 45-60 and column 4, lines 35-65.

Mishima teaches all the features of these claims except the spraying method using a target assembly and the moving system with starting and stopping as claimed.

However, Boguslavsky teaches a method of apply gas thermal coatings (which would apparently be thermal spray coating, or at the least spray coatings) to cylindrical substrates. Column 3, lines 55-65, column 4, lines 5-10 and 60-65 and figure 1 (cylindrical target = workpiece 9). The method includes mounting a cylindrical target to a target assembly that holds the target. Figure 1 and column 3, line 65 through column 4, line 5. The target can be rotated at a constant, set rate to perform coating. Figure 1 and column 5, lines 5-30. The spray device is activated to spray a coating onto the target in a desired fashion. Column 5, lines 5-30 and figure 1. It is indicated that the motion of the target can be started and stopped at varying, unexpected, points during the coating process. Column 5, lines 25-35.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mishima to use a cylindrical target holder and application device system as suggested by Boguslavsky in order to provide a desirable coating, because Mishima teaches a desire to apply coating to a cylindrical target in the form of a sputtering target using a spray system and Boguslavsky teaches a device and method for achieving controlled coating using a cylindrical target holder and rotater and a spray device holder and mover. It would further have been obvious to modify

Mishima in view of Boguslavsky provide that the target motion would be stopped and restarted at various points during the spraying process with an expectation of providing a desirably sprayed article, because Boguslavsky provides a system that anticipates that unexpected stops of the rotation drive will occur during the process and provides a system whereby the articles will not be coated at this time. This provides the suggestion that stops are expected to occur and that restarting would also occur so that the spraying process can be continued until the entire desired coating is provided. This also provides for "varying the rate" of rotation of the target as in claim 54, because "stopping" the target's rotation will vary the rate from the regular amount of rotation.

7. Claims 41, 44, 45 and 47-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mishima in view of Boguslavsky as applied to claims 39 and 54 above, and further in view of Lauterbach (US 3900639).

Mishima in view of Boguslavsky teach all the features of these claims except the gas flow to divert smaller particles.

However, Lauterbach teaches a method of plasma spraying. Column 3, lines 10-30. Lauterbach teaches to direct a gas flow across the plasma stream between the plasma spray device and the substrate. Column 3, lines 10-50. This gas flow causes lighter (which would include smaller) particles to be blown out of the plasma stream and conveyed outside of the range or area of the surface of the workpiece to be coated. Column 3, lines 15-45 and 55-65. The substrate can be a cylinder. Column 4, lines 60-65

and figure 4. The specific sizes (volumes) of material to be removed can be precisely controlled by varying the speed, etc. of the gas spray based on the material to be used. Column 6, lines 5-20. The gas can be anaerobic, such as argon or nitrogen. Column 5, lines 15-20. The gas can also be reducing, such as hydrogen or air. Column 5, lines 15-20.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mishima in view of Boguslavsky to use the diverting gas as suggested by Lauterbach in order to provide a more uniform coating, as Mishima in view of Boguslavsky desires to apply a uniform coating and Lauterbach teaches a method that allows for a more uniform coating by directing a diverting gas flow across the plasma stream that removes small and undesirable particles. Lauterbach also provides that the gas can be anaerobic, nitrogen, or reducing. It further would have been obvious to perform routine experimentation based on the specific material to be used to optimize the gas flow rate (speed) to remove particles of less than a predetermined size, and to determine the optimum of that size, because Lauterbach teaches that specific sizes (volumes) of material to be removed can be precisely controlled by varying the speed, etc. of the gas spray based on the material to be used.

8. Claims 43 and 46 rejected under 35 U.S.C. 103(a) as being unpatentable over Mishima in view of Boguslavsky and Lauterbach as applied to claims 41, 44, 45 and 47-51 above, and further in view of Borom et al (US 5897921).

Mishima in view of Boguslavsky and Lauterbach teaches all the features of these claims except the directing of a gas flow or blast on a surface location of the target proximate the deposition zone to preclean.

However, Borom teaches a method of plasma spray coating a rotating substrate. Figure 1 and column 3, lines 15-25. Borom teaches that prior to coating, a preheating device 26, which can be, for example, another conventional air plasma torch (without powder injection) or other gas torch, is directed at the area to be coated to raise the temperature such that localized melting will take place upon coating. Column 4, lines 30-65.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mishima in view of Boguslavsky and Lauterbach to use the preheating gas as suggested by Borom in order to provide a better bonding of the applied coating and to preclean, as Mishima in view of Boguslavsky and Lauterbach desires to apply a uniform coating by plasma spraying and Borom teaches a method that allows for an improved bonding of the applied coating by preheating the area to be coated with another plasma torch. It is the Examiner's position that this would inherently provide a precleaning of the area as well, due to the temperature of the plasma torch and the temperature needed to raise the area to the melting point.

9. Claims 42 and 53 rejected under 35 U.S.C. 103(a) as being unpatentable over Mishima in view of Boguslavsky as applied to claims 39 and 54 above, and further in view of Borom et al (US 5897921).

Mishima in view of Boguslavsky teaches all the features of these claims except the directing of a gas flow or blast on a surface location of the target proximate the deposition zone to preclean.

However, Borom teaches a method of plasma spray coating a rotating substrate. Figure 1 and column 3, lines 15-25. Borom teaches that prior to coating, a preheating device 26, which can be, for example, another conventional air plasma torch (without powder injection) or other gas torch, is directed at the area to be coated to raise the temperature such that localized melting will take place upon coating. Column 4, lines 30-65.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mishima in view of Boguslavsky to use the preheating gas as suggested by Borom in order to provide a better bonding of the applied coating and to preclean, as Mishima in view of Boguslavsky desires to apply a uniform coating by plasma spraying and Borom teaches a method that allows for an improved bonding of the applied coating by preheating the area to be coated with another plasma torch. It is the Examiner's position that this would inherently provide a precleaning of the area as well, due to the temperature of the plasma torch and the temperature needed to raise the area to the melting point.

10. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mishima (US 5338425) in view of WO 99/61674 (hereinafter '674).

Mishima teaches that it is well known to desire to uniformly coat cylindrical sputtering targets with various materials. Column 2, lines 50-65, column 3, lines 45-50 and column 8, lines 29-45. The materials are applied by plasma spraying using plasma gas generated in an atmosphere or non-reactive gas atmosphere. Column 3, lines 45-60 and column 4, lines 35-65.

Mishima teaches all the features of these claims except the spraying method using a target assembly and the moving system with varying of the rate of motion of the target during spraying as claimed.

However, '674 teaches a method of flame or plasma spraying a cylindrical sputtering target. Page 3, lines 1-6. While '674 describes the process using a flame spray embodiment, the invention can also be used in accordance with the processing details and principles described to apply the coating by plasma spraying. Page 8, lines 1-20. To apply the coating, '674 describes mounting the target in a target assembly where it is rotated for spraying. Page 10, lines 24-30 and page 9, lines 1-5. The spray system is activated to spray particles of coating material towards a deposition zone on the target and the spraying is continued to cover the target. Figure 1 and page 8, line 20 through page 9, line 8. '674 teaches to monitor the substrate temperature during the process (page 10, line 24 through page 11, line 30) and that the deposition rate be controlled to

maintain the desired substrate temperature (page 12, line 19 through page 13, line 10) where adjustment of various parameters may be necessary to obtain satisfactory coatings (column 13, lines 10). Controller 14 is provided that monitors the temperature sensors and can control the complete process to maintain the temperatures and coating thicknesses desired. Page 14, lines 10-27. Rotational speed of the substrate target is described as one of the parameters that affect deposition rate. Page 12, lines 25-30.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mishima to use a cylindrical target holder and application device system as suggested by '674 in order to provide a desirable coating, because Mishima teaches a desire to apply coating to a cylindrical target in the form of a sputtering target using a spray system and '674 teaches a device and method for achieving controlled coating using a cylindrical target holder and rotater and a spray device holder and mover. It would further have been obvious to modify Mishima in view of '674 provide that the target motion would be varied at various points during the spraying process with an expectation of providing a desirably sprayed article, because '674 provides a system that monitors substrate temperature and controls various process features such a deposition rate based on the monitored substrate temperature, and the control of the deposition rate would include control of the rotational speed of the target during spraying. This provides the suggestion that variation in temperature is expected to occur and varying the rotation rate of the target

in response to these temperature variations is a known and desirable method for keeping the substrate temperature in the desired range.

11. Claims 44 and 47-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mishima in view of '674 as applied to claim 54 above, and further in view of Lauterbach (US 3900639).

Mishima in view of '674 teach all the features of these claims except the gas flow to divert smaller particles.

However, Lauterbach teaches a method of plasma spraying. Column 3, lines 10-30. Lauterbach teaches to direct a gas flow across the plasma stream between the plasma spray device and the substrate. Column 3, lines 10-50. This gas flow causes lighter (which would include smaller) particles to be blown out of the plasma stream and conveyed outside of the range or area of the surface of the workpiece to be coated. Column 3, lines 15-45 and 55-65. The substrate can be a cylinder. Column 4, lines 60-65 and figure 4. The specific sizes (volumes) of material to be removed can be precisely controlled by varying the speed, etc. of the gas spray based on the material to be used. Column 6, lines 5-20. The gas can be anaerobic, such as argon or nitrogen. Column 5, lines 15-20. The gas can also be reducing, such as hydrogen or air. Column 5, lines 15-20.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mishima in view of '674 to use the diverting gas as

suggested by Lauterbach in order to provide a more uniform coating, as Mishima in view of '674 desires to apply a uniform coating and Lauterbach teaches a method that allows for a more uniform coating by directing a diverting gas flow across the plasma stream that removes small and undesirable particles. Lauterbach also provides that the gas can be anaerobic, nitrogen, or reducing. It further would have been obvious to perform routine experimentation based on the specific material to be used to optimize the gas flow rate (speed) to remove particles of less than a predetermined size, and to determine the optimum of that size, because Lauterbach teaches that specific sizes (volumes) of material to be removed can be precisely controlled by varying the speed, etc. of the gas spray based on the material to be used.

12. Claims 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mishima in view of '674 and Lauterbach as applied to claims 44 and 47-51 above, and further in view of Borom et al (US 5897921).

Mishima in view of '674 and Lauterbach teaches all the features of these claims except the directing of a gas flow or blast on a surface location of the target proximate the deposition zone to preclean.

However, Borom teaches a method of plasma spray coating a rotating substrate. Figure 1 and column 3, lines 15-25. Borom teaches that prior to coating, a preheating device 26, which can be, for example, another conventional air plasma torch (without powder injection) or other gas torch, is directed at the area to be coated to raise the

temperature such that localized melting will take place upon coating. Column 4, lines 30-65.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mishima in view of '674 and Lauterbach to use the preheating gas as suggested by Borom in order to provide a better bonding of the applied coating and to preclean, as Mishima in view of '674 and Lauterbach desires to apply a uniform coating by plasma spraying and Borom teaches a method that allows for an improved bonding of the applied coating by preheating the area to be coated with another plasma torch. It is the Examiner's position that this would inherently provide a precleaning of the area as well, due to the temperature of the plasma torch and the temperature needed to raise the area to the melting point.

Response to Arguments

13. Applicant's arguments with respect to claims 39, 41-51 and 53-54 have been considered but are moot in view of the new ground(s) of rejection.

As to the spraying of a cylindrical sputtering target with a uniform coating by plasma spraying, the Examiner has cited Mishima as discussed above. Furthermore, WO '674 as discussed above also provides plasma spraying a cylindrical sputtering target.

As to the argument that Boguslavsky does not teach or suggest stopping and restarting or varying the rate of target motion during the spraying step, the Examiner is

of the position that it does teach this to the extent required by the claims. As worded the claims provide for a plasma spraying step in which plasma spraying occurs. However, there is no requirement that this plasma spraying step requires continuous application of the coating by plasma spraying. Thus, as worded, the plasma spraying step can include starting and stopping coating as described by Boguslavsky.

The Examiner further notes that the newly cited reference to '674 would provide varying the rate of target motion during continuous or intermittent plasma spraying.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KATHERINE BAREFORD
PRIMARY EXAMINER